

Section II

INTERIM CONCLUSIONS

This is an **INTERIM REPORT** only. Our work is incomplete and ongoing at this time. Any observations, opinions, or conclusions pertaining to Interim Conclusion 3 stated herein is of a preliminary nature only and is subject to change upon results of further study.

1. The subject residence was not damaged by the September 3, 2016, magnitude 5.8 Pawnee, Oklahoma earthquake that occurred approximately 180 miles northwest of the subject residence.
2. The exterior separations and/or cracks in the exterior brick veneer were consistent with long-term and ongoing, differential movement from active clay soils on which the foundation system was supported due to normal seasonal moisture fluctuations.
3. Moisture fluctuations in the active clay soils from possible sewer and/or water line leak(s) near the interior center of the residence are believed to have caused differential movement of the concrete floor slab, resulting in the interior "block-cracks" and other similar defects in the partition wallboard walls and/or ceilings.

In the course of our work on this assignment, we identified additional work that should be performed to substantiate our opinions and conclusions stated in Interim Conclusion 3. This recommended additional work is described in **SECTION IV - RECOMMENDATION FOR ADDITIONAL WORK**.



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CONCLUSIONS

1. The cracked concrete slabs in the garage and driveway were not caused by the reported earthquake.
2. The cracked concrete slabs in the garage and driveway were caused by differential movement of the supporting active clay soils due to variations in moisture and long-term cyclical loads from vehicles. These cracks existed prior to the September 3, 2016 earthquake event.

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CONCLUSIONS

1. The magnitude 5.0 earthquake that occurred on November 7, 2016, the epicenter of which was located near the subject property, resulted in instrumental intensity VI at the subject residential property and did not cause structural damage to the residential property.
2. The origin of the damage observed to the floor, ceiling tiles, and driveway slab under the carport was from differential foundation movement related to volumetric soil changes from soil moisture variations over time. Poor construction techniques found at the foundation contributed.

Section II **CONCLUSIONS**

1. An earthquake on September 3, 2016, caused a crack in the west kitchen wall and a crack in the bedroom ceiling.
2. The concrete masonry unit foundation wall cracks, stuck doors, laminate wood flooring separations, and other previously repaired wall cracks were not caused by an earthquake, but instead, were caused by differential movement of the active clays on-site.

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CONCLUSIONS

1. The interior and exterior wall finishes at the [REDACTED] residence were not damaged by the September 3, 2016, magnitude 5.8 Pawnee, Oklahoma, earthquake that occurred about 82 miles northwest of the Property.
2. The reported and observed non-structural separations and cracks in the interior wall finishes and exterior brick veneer were consistent with long-term and ongoing, moisture, temperature, and soil movement phenomenon, including:
 - a) Natural hydrological cycle moisture fluctuations in the content of the native lean clay soils at the Property that caused cycles of vertical movements in the supporting soils that resulted in differential building movements.
 - b) Natural hydrological and temperature cycle fluctuations in the moisture and thermal content of the brick-masonry veneer-cladding that caused differential movements in the building materials.

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CONCLUSIONS

1. The residence had not been structurally damaged as a result of an earthquake.
2. The damage to the finish materials at the residence (including the cracks and separations in the gypsum-board walls and ceilings, cracks in the ceramic floor tile, and separations at the stairway treads) were caused and/or exacerbated by movement of the residence resulting from the earthquake.

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CONCLUSIONS

1. No earthquake damage was detected except for the multiple backed out wallboard fasteners (nail pops) in the walls and/or ceilings of the master bedroom and master bathroom.
2. The gap observed in the wood fascia boards above the garage, cracked brick veneer above the porch, and the concrete patio slab-on-grade crack were not earthquake-related, and had existed prior to the reported earthquake.

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CONCLUSIONS

1. No structural damage to the residence occurred as a result of a magnitude-5.8 earthquake that happened at a site approximately 71 miles northeast of the subject residence on September 3, 2016.
2. The uneven living room floor, interior wall and ceiling cracks, and exterior brick veneer and concrete driveway cracks were not caused by the recent reported earthquake, but rather, they are the result of a long-term condition caused by differential movement of the supporting active clays at the site and poor grading and/or drainage away from the residence.

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CONCLUSIONS

1. The magnitude 5.8 earthquake that occurred on September 3, 2016, located approximately 46 miles west northwest of the subject property, resulted in instrumental intensity IV at the residential property and was not the cause of Loss.
2. The reported Loss of gypsum wallboard cracking and cracked concrete floor slab was caused by internal loss of bearing of the concrete floor slab, and to a lesser extent long-term differential foundation movement related to cyclical soil moisture changes.
3. The origin of the Loss was from poor design and/or construction of the floor slab and volumetric soil changes from soil moisture variations over-time.

Section II **CONCLUSIONS**

1. The cracks in the brick chimney were not caused by a wind event.
2. Random pieces of mortar on the roof surface from the loose cracked chimney crown and a leaned wooden fence in the back yard were probably related to a 70 miles-per-hour thunderstorm wind event that reportedly occurred on April 21, 2017.
3. The localized offset bricks near the top of the chimney, the previously cracked and repaired mortar joints near the top flat portion of the chimney shoulders, and spalled brick surface on the chimney were caused by normal weathering and seasonal freeze/thaw cycles over the years.

Section II

CONCLUSIONS

1. No structural damage was detected at the subject residence as a result of the reported 5.8M earthquake on September 3, 2016, whose epicenter was located in Pawnee, Oklahoma.
2. The cause of the interior floor variations was attributed to undersized floor joist support beams that had sagged within the support's span from east-to-west between the spot footings. Similar improper floor support framing was detected beneath the large family room, kitchen, bathroom, water heater closet, and the two west bedrooms.
3. We strongly recommend that a qualified professional conduct an evaluation of the raised floor joist support framing and promptly implement the necessary structural modifications prior to allowing the residence to be occupied and/or any additional furnishings moved into the residence. These common, additional loads could cause the raised floor support system to structurally fail.

Section II CONCLUSIONS

1. No structural damage to the residence occurred as a result of an earthquake.
2. The separations detected in wall corners and separations between the wall baseboard and floor in the kitchen and in the master bathroom were not caused by an earthquake, but rather, they were caused by a combination of natural movements in the active clay soils subgrade beneath the slab and/or foundation, vertical displacement of the slab due to additional densification of the slab subbase material over a period of time, and/or potential void(s) beneath the floor slab due to soil erosion or hydrocompaction related to a disconnected drainage pipe below the slab of the bathtub in the master bathroom.

Section II

CONCLUSIONS

1. The [REDACTED] residence was not damaged as a result of earthquake-related forces.
2. The damage to the finish materials (including but not limited to the cracks and separations in the brick walls and gypsum-board walls and ceilings) was the result of differential foundation movement.
3. The foundation movement was caused by long-term consolidation/settlement of site soils due to applied loads and the effects of seasonal soil moisture variations.

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CONCLUSIONS

1. The magnitude 5.8 earthquake that occurred on September 3, 2016, whose epicenter was located approximately 112 miles northwest of the subject property in Pawnee, Oklahoma, resulted in instrumental intensity IV at the [REDACTED] residential property and did not cause structural damage.
2. The cause of the damage to the interior floor and gypsum wallboard was attributed to:
 - a) differential movement from poor construction of the floor framing,
 - b) deterioration of the wood floor joists from long-term exposure to moisture, and
 - c) spot CMU footings at grade and not below the frost level.

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Conclusions 1 and 2 from our original Report of Findings remain unchanged and are repeated below for convenience. Supplemental conclusions 3 through 8 are added as stated below.

Conclusions

1. The magnitude 5.8 earthquake that occurred on September 3, 2016, whose epicenter was located approximately 112 miles northwest of the subject property in Pawnee, Oklahoma, resulted in instrumental intensity IV at the [REDACTED] residential property and did not cause structural damage.
2. The cause of the damage to the interior floor and gypsum wallboard was attributed to:
 - a) differential movement from poor construction of the floor framing,
 - b) deterioration of the wood floor joists from long-term exposure to moisture, and
 - c) spot CMU footings at grade and not below the frost level.

Supplemental Conclusions

3. The moisture in the crawl space beneath the floor framing was sourced from the roof runoff that subsequently was entering through the crawl space vents.
4. The elevation variations of the hardwood floor covering are a combination of several items,
 - a. moisture intrusion into the crawl space,
 - b. deterioration and/or deflection of the framing lumber, and
 - c. poor and/or unconventional framing of the floor.
5. At the time of our on-site evaluation, there were no visible indications that the sealant failure around several of the window openings had caused damage to the exterior walls and/or wall framing.
6. The separations of the kitchen cabinets from the interior partition walls and/or separations of cabinet components were caused by the elevation variations of the floor framing that support the interior partition walls.
7. The damage can be contributed to faulty and/or poor construction of the floor framing and location of the air vents in the foundation stem walls.

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8. The primary cause of the reported damages was the result of poor construction of the floor framing, placement of the crawl space air vents, and lack of positive drainage of surface ground water away from the structure.

Discussion

The following supplemental questions were asked by the adjuster after our Report of Findings was published:

- A. Where is the moisture in the crawl spacing coming from?
- B. Are the variations in the wood floor occurring due to displacement from the vertical supports in the crawl space? Why have the vertical supports failed, is it due to the moisture in the crawl space or faulty workmanship?
- C. Is there any specific damage in the exterior walls from the sealant failure?
- D. What is the cause of the damage to the cabinets (kitchen)?
- E. Is all the damage due to faulty workmanship or due to water damage or both?
- F. If there is more than one cause of loss, can you separate the damages?

Supplemental Responses:

The moisture in the crawl space beneath the floor framing was sourced from the roof runoff that sub sequentially was entering through the crawl space vents. Within the crawl space beneath the residence, the soils were mostly wet and could be deformed by hand. It was observed that the crawl space vents were located at or slightly above grade. The residence did not have rain gutters installed along most of the roof edges and the runoff accumulates along the foundation as there was minimal to no slope of the ground surface adjacent the residence. The roof runoff accumulates adjacent the foundation and sub sequentially in turn enters the crawl space vents and accumulates in the crawl space. This moisture creates a moist environment conducive to the decay of wood over time (Photographs 1 and 2).

The elevation variations of the hardwood floor covering are a combination of several items, moisture intrusion into the crawl space, deterioration and/or deflection of the framing lumber, and poor and/or unconventional framing of the floor. Observed within the crawlspace there were areas where the floor joists had different span lengths from the omission of mid-span supports or differing locations of the vertical supports within the same joist framing pattern. At several locations along the foundation wall, the vertical supports for the exterior rim joist, the bottom had decayed to the condition where there was no contact with the ground surface. Varying span lengths result in

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CONCLUSIONS

1. The [REDACTED] residence was not damaged as a result of earthquake-related forces.
2. The damage to the finish materials (e.g. cracks in the brick veneer) was the result of thermal expansion and contraction of building materials which resulted from normal fluctuations in temperature and moisture.

Section II CONCLUSIONS

1. The magnitude 5.8 earthquake that occurred on September 3, 2016 (the Event), located approximately 63 miles northwest of the subject property, resulted in instrumental intensity IV at the [REDACTED] property and did not cause structural damage to the residence.
2. The residence was not cosmetically damaged by the recent seismic activity that occurred on September 3, 2016.
3. The rock masonry veneer was not damaged by the recent seismic activity that occurred on September 3, 2016. The damage observed was from temperature and moisture variations over time.
4. The cracking and/or separations in the kitchen floor tiles and grout were most likely caused by improper installation, and were not caused by the recent seismic activity that occurred on September 3, 2016.